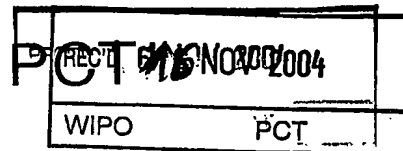


# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220



## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/CH2004/000151

International filing date (day/month/year)  
15.03.2004

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC  
C01B25/32, C01B25/455, C01F11/18, C01F11/46

Applicant  
EIDGENÖSSISCHE TECHNISCHE HOCHSCHULE ZÜRICH

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for International preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/CH2004/000151

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/CH2004/000151

**Box No. II Priority**

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

**Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-24, 26-28, 30-32
	No: Claims	25,29
Inventive step (IS)	Yes: Claims	1-24, 26-28, 30, 31
	No: Claims	32
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: US-A-5 276 251 (KAMEI YOSHINOBU ET AL) 4 January 1994 (1994-01-04)  
D2: US-A-4 711 769 (INOUE SENYA ET AL) 8 December 1987 (1987-12-08)  
D3: US-A-4 855 118 (ICHINOSE NOBORU ET AL) 8 August 1989 (1989-8-08)

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and discloses a process for treating waste organic phosphates. In said process a waste organic solvent, composed mainly of organic phosphate, is mixed with a metal salt of an aliphatic carboxylic acid. The metal may be potassium, calcium or aluminium, and the carboxylate is preferably an acetate. The mixture is then heated and optionally burned to form a stable solid metal phosphate.

The subject-matter of claim 1 differs from this known method in that the metal carboxylate employed in the present process has a mean carbon value of at least 3 per carboxylate group, which is not the case in the method of D1. Furthermore, there is no disclosure in the prior art method of forming droplets of the precursor solution which is to be oxidised.

The subject-matter of claim 1 and dependent claims 2-24 is therefore new (Article 33(2) PCT).

Claim 25 concerns a metal salt obtainable by the method of any of claims 1-16. This is a so-called "product-by-process" claim, whereby a product is defined in terms of its method of manufacture as opposed to its physical characteristics. As such, it is not possible to compare the product of claim 25 to the products of the prior art, as its physical characteristics are not disclosed.

From page 9 of the description it is clear that the metal salts of the present application have a BET equivalent diameter in the range of 5 to 200 nm.

Document D3 discloses the manufacture of fluorapatite, produced by subjecting

calcium monohydrogen phosphate, calcium carbonate and calcium fluoride to mechanochemical action, whereby they react with one another in water. The resulting fluorapatite is a fine powder with a particle size of 100 to 400 nm.

Thus, claims 25 and 29 are not new over the metal salt D3.

As the features of claims 26-28, 30, and 31 are not known from the material of D3, said claims are novel.

The uses of a metal salt, according to claim 32, are not disclosed in D3, therefore said claim is formally novel.

3. The problem to be solved by the present invention may be regarded as the provision of a method for the production of nanoparticulate metal salts.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The applicant has shown, by way of examples, that the present method provides a simple and reproducible method for the production of metal salt nanoparticles.

Claims 2-24 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to inventive step.

The metal salts of claims 26-28, 30 and 31, having advantageous water release rates and bulk densities, are also thought to be inventive.

The subject-matter of claim 32 is not considered to be inventive for the following reason:

The listed uses are common uses of metal salts, and are well known to those skilled in the art. As previously discussed, the metal salts according to at least claim 25 are not novel. It is not thought to be inventive to employ known metal salts in their common applications, especially as no technical effect has been demonstrated by doing so.